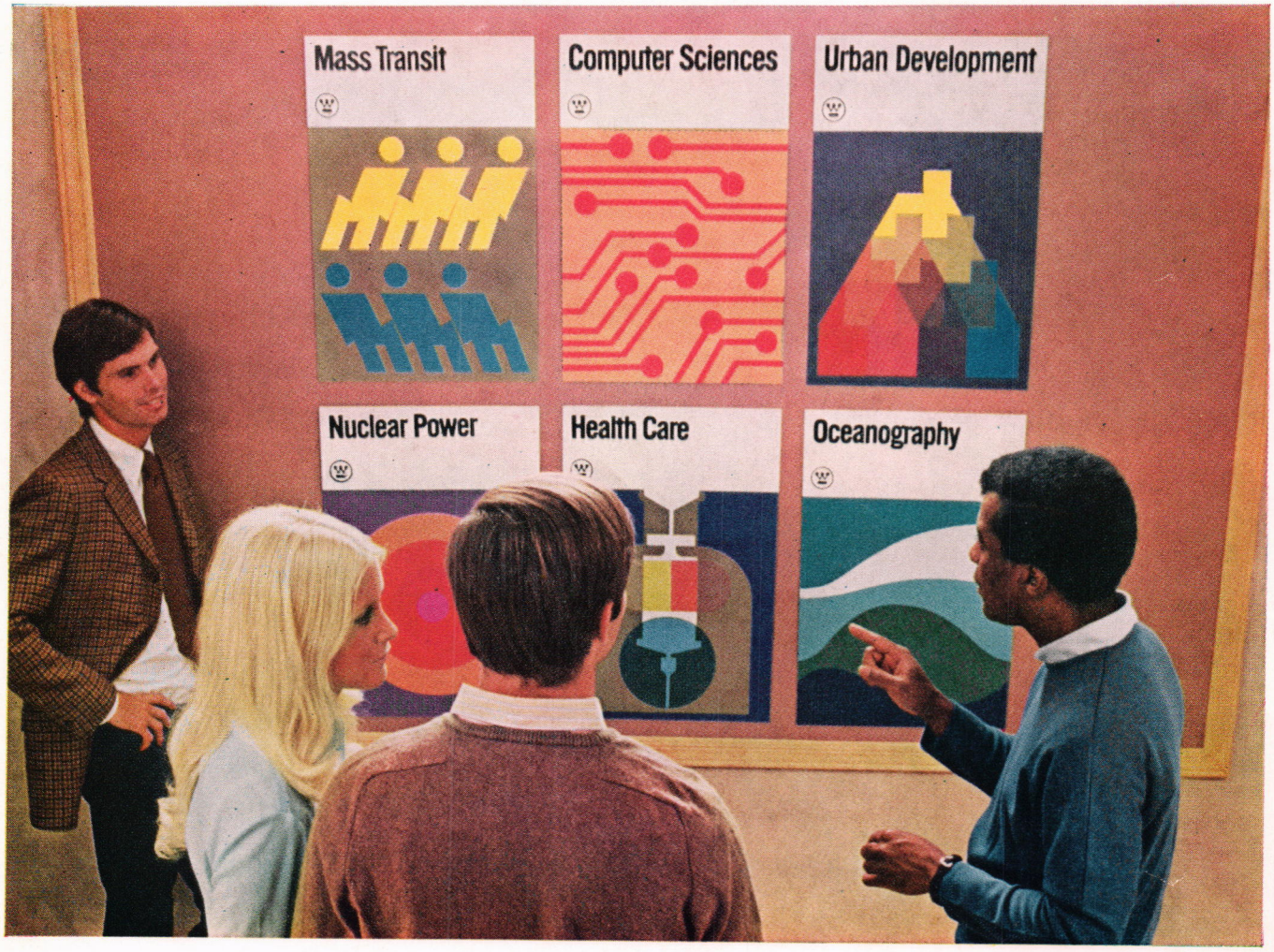
VOL. 29 ● NO. 3 SCHOOL OF ENGINEERING AND APPLIED SCIENCE DEC.-FEB.

MECHELECIV

Frosh Frustration

If you want to engineer a better world...



a great place to start is with one of the most diversified companies in the world.

Westinghouse thinks its responsibilities are as big as its capabilities—and that's big.

And when you're in everything from computers to urban development, to medical science, to mass transit, to oceanography—there's action. For example...

Transportation: Our computerized transit systems can operate on a 90-second schedule, and meet the transportation needs of many cities.

Urban Development: Our new construction concepts will provide better communities across the country. Projects are planned or underway in 30 major cities.

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Nuclear Power: Westinghouse leads the way in nuclear power generation. Seven nuclear plants in operation, 34 in various stages of design. We're working on a breeder reactor to keep us ahead.

That's a sampling. We're just getting started. If you'd like to help us engineer a better world, talk with our campus recruiter. Or write Luke Noggle, Westinghouse Education Center, Pittsburgh, Pa. 15221. An equal opportunity employer.

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The context of this magazine represents the individual expressions of the authors or editors and does not necessarily reflect the views or attitudes of the student body or of the University Administration.

How good are you
How to keep a cow's mind on mi Instead of flies.
engineering doesn't all happen in a development lab"
THE OLD SWIMMING HOLE
"I never feel like a rookie"
Do you think a bright young engineer should spend his most imaginative years on the same ass?
Charlie Stumbles In
REMEMBER WHEN?
start knocking
blah!
Come and sleep late.
HOMEWORK SUBSTITUTE
WHAT, ME WORRY
Who has the hottest action going?
"YES"
Pull for
PULLEN
You can't buy this piece
make your life interesting.
Is it possible to pass?
It's not ofte an enginee gets to
NAL EXAM
Spin
Punch for pay
patent pending
BANYASZ
A unique combination of capabilities
FAILURE
finding is no swe
it's Getting a
good one tha
bothers me
Welcome to the cold, cruel world.
ROCKET MOTOR SEPARATION
PROJECTED FLIGHT
DEPTH CHARGE PAYLOAD-ALTERNATE
AIRFRAME SEPARATION
TORPEDO PAYLOAD
DESTROYER LAUNCHED
ASROC WEAPON SY
(ANTISUBMARINE RO KET)
SUB
Can there be this kind of excitement in engineering?
The Challenge
engineers and scientists are helping to satisfy
BIG IDEA
Parking lots are places where people bang!
Neither do
Park with
DAVIES
Urban Transportati

WHEN

IN

DOUBT . . .

PUNT

SIGNED

THE STAFF

LETTERS TO THE EDITOR

Dear Editor,

While in High school I pictured college as a place where, since the major occupation was thinking, everything would be done on a rational basis. I also expected that rational thinking people would produce a rational curriculum, noticeably lacking in high school, and rational rules, noticeably lacking in the world. While I have been somewhat disappointed with the curriculum and the rules, the thinking more than makes up for both. I'm referring to the reaction of the faculty and administrators have to requests from students for changes or additions to SEAS. Whereas change outside of school meets not only a brick wall, but a brick wall moving in a direction opposite to that of change. Requests to SEAS meets with a reasonable flight of stairs. These stairs recently led to the acquisition of a new DH House, even before the old one was torn down. Up another flight is the improvement of the Junior EE Lab by assuming no previous experience with lab equipment and by reducing the large amount of writing previously required.

Recently E Ad 115 was placed in the third semester of the curriculum and is currently causing much concern among many sophomores. The course seems to be taught at a level above that which the sophomores are prepared for. Indications of this are the low midterm scores and the difficulty some of the graduate students are having with the course. It seems to be taught at a graduate level, and there was an attempt to cover material that the graduates would need – excellent for the graduates, but perhaps discouraging to sophomores who will probably forget most of it by the time they get to graduate school (assuming they were able to understand it to begin with). If E Ad 115 is to be of help to us it should be taught when it is needed, but at a level that will not lose the students. If necessary, grads and undergrads should be separated.

It would have been easy to write an emotional, controversial letter, but rational thinking is beginning to wear off on me, and the rational approach seems to be basic to Engineering. If the students and faculty involved would get together on this, both will benefit.

Chris Edler

Dear Sirs:

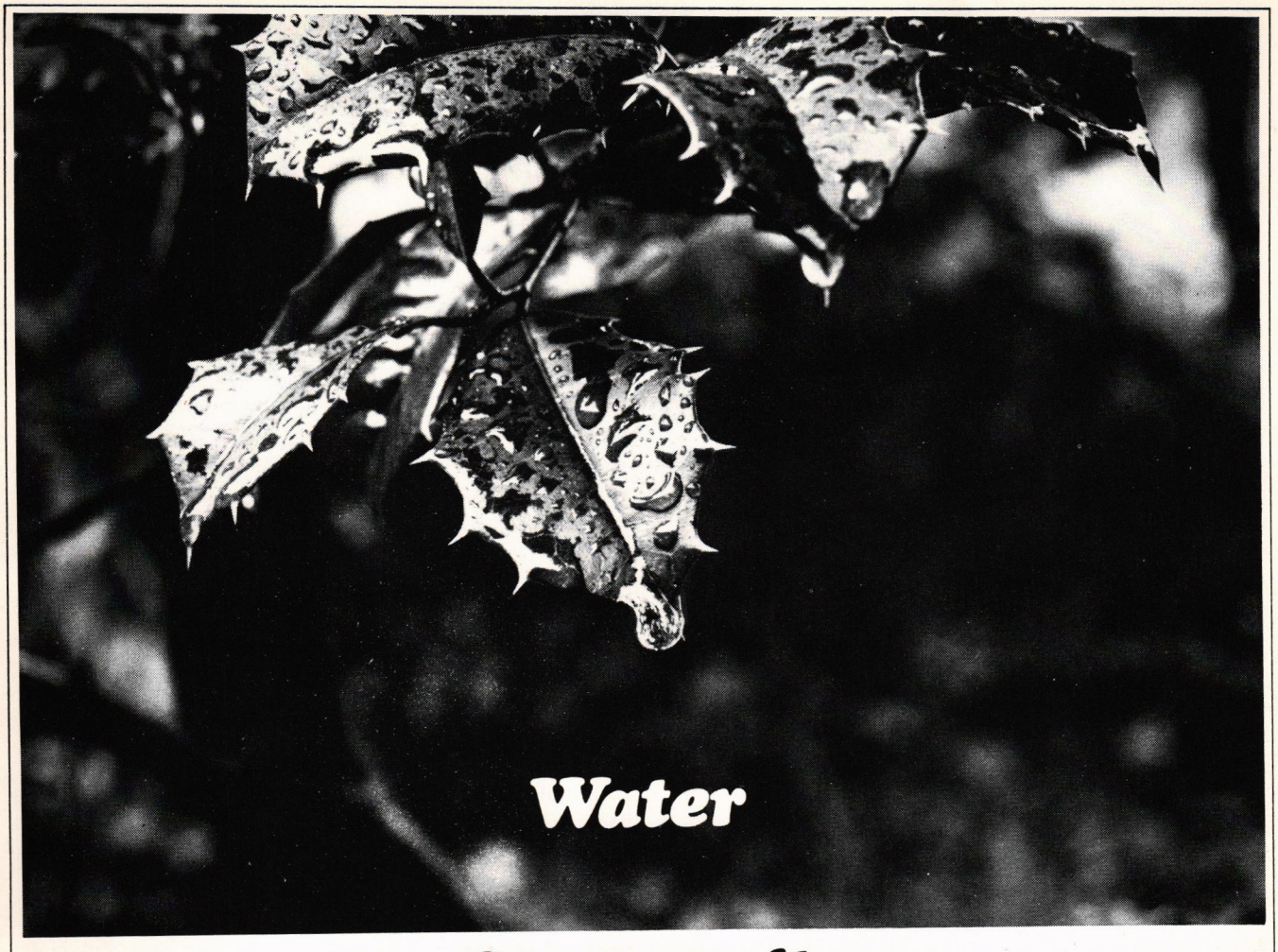
I would like to take a different view of the raised by the poor junior in the previous issue. It is a fact that you can study several days for any course and still pass it. This is due in part, to the fact that all the grades are so ridiculously curved (e.g. Ead 115, where ten points was passing and five points were given for neatness). I think part of it is that the class speed must be guided by the class average, this makes some classes boring for those who are smarter than the average, possibly some people even study ahead.

The major problem, however, I think is the almost complete lack of participation in most classes. In almost all courses the students file in, the professor follows, and lectures for fifty minutes. It is the rare class where there is any discussion. It is my feeling that the lecture should complement the book, not revise it, providing the student with something after the book to think about.

The main problem is the lack of interest on the part of the students. (I am as guilty of this as anyone, but I do not go to many classes.) I feel that it is up to the students to make the classes as interesting or as boring as they wish. There are a few courses where the professor refuses to allow discussion, but I think that most try to initiate discussion, but eventually give up. Better students make for better classes.

Michael Rothchild

LETTER TO THE EDITOR POLICY. The opinions set forth in the "Letter to the Editor" page of this magazine are not necessarily the opinions of the staff of *Mechelecіv* magazine. This page is set aside each issue for use by students, alumni, faculty, and staff of the School of Engineering and Applied Science. The staff will also accept letters from other sources if the letters concern the magazine or would be of interest to the students, alumni, faculty, and staff of the S.E.A.S. *Mechelecіv* reserves the right to edit any letter if lack of space deems it necessary. If, in the opinion of the Editorial Staff of *Mechelecіv*, a letter appears to be unprintable, the staff reserves the right to return the letter to the sender stating the staffs' reasons for withholding it from publication. All letters must be signed; however, pen names may be substituted if requested.



Conserve it.
Respect it.

Make a career out of it.

More people are deriving more benefits from our water resources than ever before in history. But today we are facing a new challenge: enhancing the quality of life by balancing the development of our water resources with the preservation of our natural environment. It is a big order, and it has to be filled.

That's where you come in. The Corps of Engineers needs engineers who are interested in the broad picture, who have a creative approach to today's problems, and who want to work with economists, planners, landscape-architects, biologists, and others to build a better quality of life. This is a chance for real involvement and achievement with an agency committed to meeting changing public needs—a chance to make it count.

Our challenges are not concerned solely with water resources. We are also applying all the techniques of modern technology to the improvement of our construction capability — systems analysis, computer technology, advanced materials research, and many more. As a Corps professional, you will face these challenges as a member of the largest engineering/construction organization in the world. Think about a career with us . . . and write today for full information.

Corps of Engineers

Department of the Army
Washington, D.C. 20314

An equal opportunity employer m/f

THINK ABOUT IT – WON'T YOU?

by Bruce Nixon EE

The large corporation stands in an imposing and important spotlight for many young people about to graduate from college.

Many large businesses offer security in a steady, often easy, position, for the new graduate.

According to Stewart S. Cort, President of Bethlehem Steel Corporation, "The college campus and the corporation – and, indeed, all other business-related organizations – are linked together by close and inseparable bonds of mutual interest. *We* depend on our colleges and universities and they, in turn, depend on us. We need their help . . . and today – right now – they most urgently need ours. It is the latter part of the equation that appears in jeopardy now."

And, points out Mr. Cort, corporations are searching for the "new Look", and thus feel a necessity for bringing new minds and new ideas into their operation.

However, these large corporations hold a great deal of concentrated political and economic power, not only through their enterprises, but also through grants from the government and other enormous financial supporters.

Therefore, as the recruiters begin to call, the student soon to enter this world of business should consider the role of the corporation in his society.

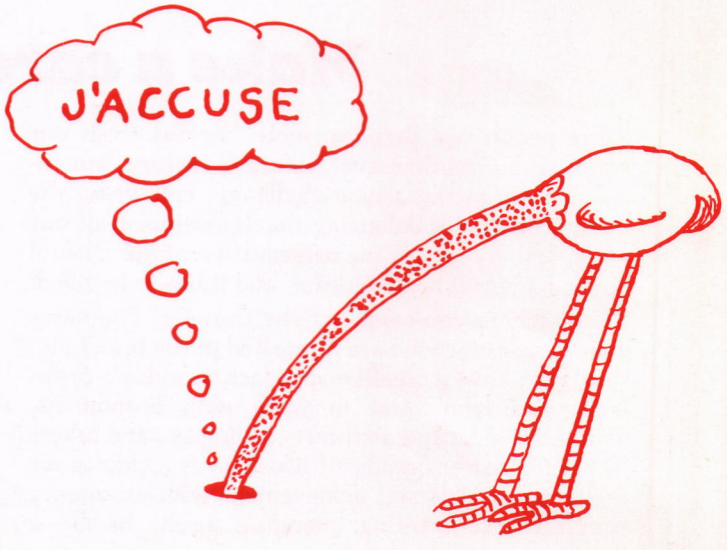
Because of their size, most corporations have a great deal at stake financially. As a result, they are viewed as essentially money-making organizations geared to make a profit – often ignoring the social responsibilities that go along with their economic endeavors. In their profit-making development, large industries that have been altering and destroying the environment are now battling major reforms that would reduce or correct this alteration and destruction because of the financial enormity involved in such reforms.

The prospective corporation man should consider his own role in business. He should ask himself – have the corporations ignored the human factor, that each man in their organization is an individual and should not be expected to act as a machine?

I have been speaking in terms of stereotype, of course, but this is valid because I am on the outside looking in. And this is true of anyone looking prospectively at a corporation.

Existing in a technologically progressive society, the corporation has a responsibility beyond that of production and profit. For this reason, the person entering big business must be aware of the resentment of many people toward the concentrated social and economic power of the large corporations. He must also be aware that loyalty is not necessarily equated with obedience. The people leaving college today can see, and can easily understand, the benefits of criticizing this profit-oriented reasoning.

The corporations are looking for young people – and these are the people who can fill them with new ideas and new directions – directions that will lead the corporation into an era of "society-satisfying" enterprise.



FACULTY SPOTLIGHT:

DR. GERHARD SCHUELLER

by David Forsyth

Dr. Gerhard Schueller has recently joined the faculty of SEAS this fall as an Assistant Professor in the Department of Civil, Mechanical, and Environmental Engineering.

The courses he was teaching this fall were Structural Design (CE 191) and Structural Dynamics (CE 252). Dr. Schueller is doing research with Dr. A. Freudenthal on Structural Reliability and is researching on his own the Probabilistic Dynamic Analysis of Ocean Structures. In the future, he would like to teach a course on Ocean Structures.

Dr. Schueller studied at the Institute of Technology in Graz, Austria, where he received the European equivalent of a Masters degree. He then came to the U.S. and received his doctorate from Stanford University. He has authored papers on the "Reliability of Circular Piles Subjected to Ocean Waves" and on "Probabilistic Models for Texas Gulf Coast Hurricane Occurrences".

Professor Schueller feels that the Civil Engineering curriculum is very well thought out. He felt that the curriculum could be improved further by offering more courses in Sanitation Engineering. He was especially pleased to find undergraduate courses in Probability and Reliability. However, he did express his concern over the lack of organization in the University Computer Center. He felt that the hours that the Center was closed, that is, on the weekends, made the computer inaccessible at a time that a majority of engineers would use it. Since the computer is now the "slide rule of engineering", it is the hope of Dr. Schueller that the Computer Center can be reorganized to meet (to some extent) its potential.

Outside of the academic sphere of the university, Professor Schueller feels that the student-faculty relations are in need of some improvement. He states that this deficiency in communications rests with both the faculty and the students.

Dr. Schueller is member of Sigma Xi. His outside interests include boxing, track and field, and skiing. While in Europe, he was a member of the Austrian national student skiing team. Dr. Schueller also likes to go to concerts of a classical nature, and to the theatre.

We are happy to welcome Dr. Schueller to SEAS and look forward to a mutually rewarding association.

The following questionnaire was distributed on November 17, 1970, to a significant random sample of freshmen engineering students (all those that were present that day at the mandatory Applied Science 1 course).

ENGINEER'S COUNCIL
ACADEMIC COMMITTEE

—please take time to consider your answers to these questions – if a large enough percentage of you want things changed, there is a good possibility of something being done.

ENTRANCE EXAMS

☐ the results were expected and helpful

☐ the results were neither expected nor helpful

☐ I am not aware of the results

☐ I would like to know the results of:

- ☐ placement tests
- ☐ psychological tests

☐ I do not see the desirability or necessity of:

- ☐ placement tests
- ☐ psychological tests

☐ other _____

_____

_____

"GETTING ACQUAINTED" SYSTEMS

☐ my big Brother was helpful

☐ my Big Brother wasn't helpful

☐ what Big Brother?

☐ upperclassmen have helped

☐ the administration helped

☐ Mechelecіv helped

☐ what help?

APPLIED SCIENCE I COURSE

☐ informative and helpful

☐ not helpful

☐ at a convenient time of day

☐ at an inconvenient time of day

☐ suggestions _____

_____

_____

REGISTRATION

☐ current procedure is fine

☐ current procedure isn't fine

☐ suggestions _____

_____

_____

_____

ADVISORS

☐ I found my advisor helpful

☐ I didn't fine my advisor

☐ he didn't seem to know any more than I did

☐ I was easily able to see him

☐ it was difficult to see him

☐ other _____

_____

☐ suggestions _____

_____

_____

_____

MECHELECIV

☐ entertaining, informative

☐ lacking in information

☐ lacking in entertainment

☐ other _____

_____

_____

☐ suggestions _____

_____

_____

Frustrated engineering students, freshmen or not – now's your chance! Fill in and tear out the above form and mail it with two boxtops to: Editor, *Mechelecіv* Magazine, c/o The George Washington University, Thompkins 100, Washington, D.C.

FRENGES ON G.W.U.

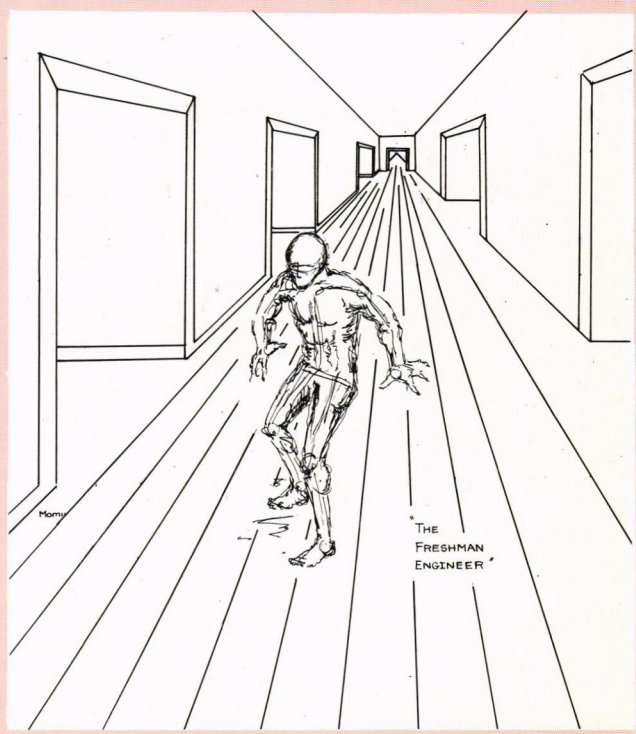
Steven K. Miller EE
Freshman Representative
Engineer's Council

As the spring semester goes into full swing, one element of the G.W.U. academic community seems to have vanished, or at least thinned out – the confused, wide-eyed and often lost freshmen. However, freshmen and upperclassmen alike retain fond memories of those bygone days. The following is presented in an attempt to understand and perhaps remedy the situation that freshmen engineering students (frenges) experienced in the Fall of 1970. As of November 17, 1970, the majority of frenges were not satisfied with the educational process at G.W. they had found themselves in for the past three months.

$10 For Parking in a No Stop – No Stand Zone During Peak Hours?

Complaints by commuters about the parking situation at G.W. are many; practical suggestions few. Having some sort of pay-as-you-go meter parking on lots as an alternative to the arbitrary two ten-hour time intervals has been suggested. Another idea is to establish a free parking area for on-campus students to allow commuters to use the free parking spaces on the streets of G.W., which are currently filled 24 hours a day by non-commuters.

Apart from the parking problem, there are several other areas of dissatisfaction. 80% of those interviewed could stand to see an improvement in the registration process. Many questioned why freshmen are not allowed to preregister, especially freshmen engineers; for many required engineering classes are only available at inconvenient times after upperclassmen preregistration and the fleet A-L registrants. Many would like to see the engineering registration process centralized. Ideally, frenges could register either in the spring of their senior year in high school or a week or so before general registration, with the entire process taking place in Thompkins Hall.

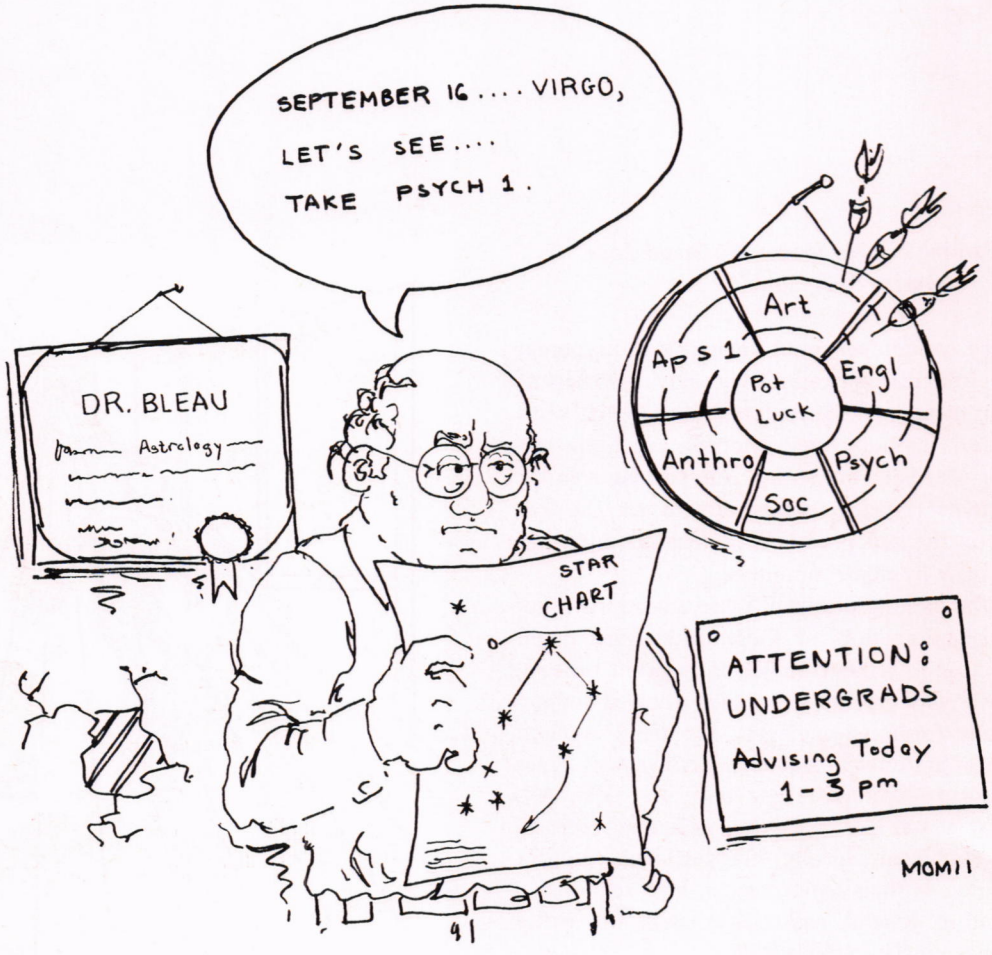


Professor Staff?

Theoretically, there are three G.W.U. systems a freshman is exposed to prior to registration – his advisor, his Big Brother, and his entrance exams. Something is amiss when 56% of the frenges feel their advisors were of little or no help to them, and 40% expressed having difficulty in even reaching their advisors. When an advisor comes to Tompkins three hours late and finds himself facing 30 people waiting in line for him, it cannot be expected that the necessary amount of advising will take place. The advising process becomes merely a clearinghouse for exemption and requirement lists, with students finding themselves in classes taught by instructors known only as "Professor Staff." To put the most number of students in the proper class, taught by an instructor best suited to the learning process of the individual student at an exclusive and convenient time should be a reality and not merely a dream. Advisors aware of the school, the schedule, the faculty, and the individual student's needs are necessary; to accomplish this, more careful selection of advisors, more time to advise, and more information available to those advising is needed.

The aforementioned "theoretically" is primarily in reference to the Big Brother system, designed to aid freshmen in all aspects of beginning study at G.W. 54% of the frenges were not aware of their Big Brothers. Some *were* helped by their Big Brothers, some found solace from upperclassmen, some obtained helpful information from the administration or *Mecheleciv;* many were left to their own devices. Many complained of same.

All freshmen were subjected to a series of tests a few days before registration – physics, math and/or English placement exams; a series of mechanical aptitude tests; and a battery of psychological tests. The English exam is designed to segregate the candidates for English 1X from those allowed to take English 1; with a sufficiently high College Board English Composition score, English 1 may be waived. Unfortunately, it wasn't until several days after the exams that the cut-off Composition score was established for the School of Engineering and Applied Science; to this day the variations on scores and the suggested classes have not been made public. (If anyone is curious, the information can now be obtained from Mr. Mannion in Tompkins 100.)



As for the physics placement exam, no mention was made as to the reason for having such an exam when there are no gradient levels in physics classes. If this exam was designed to allow those competent to waive Physics 1 to do so, such information would be gratefully accepted if it were obtained before the exam, along with information concerning the likelihood and desireability of doing so.

The G.W.U. Calculus Placement Exam is the sole criterion for placement into either the precalculus or a calculus course. After a summer of little or no studying, the frenges suddenly find themselves in a do-or-die situation, for many resulting in having to take a precalculus course when they are really suited for a calculus course. If placement in these courses depended upon College Board scores, more students would be placed in more appropriate courses than they are now.

The mechanical aptitude tests are fine as far as they go, which is just as far as the student's file; if such files are open to the student, why do 38% of the frenges want to know their scores? Much information from the administration seems to get lost on the way to the student. Having to go through a laborious process of extracting bits of information from various University sources and piece together the gathered information isn't exactly a situation that will induce high school seniors to become G.W.U. Engineers.

The psychological tests (two tests taking three hours, with questions like "Would you rather cheat on a test or make snide remarks about your superiors?") were administered to the frenges without generously providing the explanation of their purpose or function (to keep all strange people out of the S.E.A.S.? It hasn't been successful), or whether or not these tests are mandatory. 65% of those taking the psychological tests would like to know their results; the fact that the results can be obtained from the G.W.U. Counselling Service after paying a $10 fee was never publicized.

Unbeneficial, Inconvenient, and Mandatory

Besides the usual charges of incompetent teachers and boring classes, one course particularly came under fire. The Applied Science 1 course, primarily a series of lectures by members of the faculty and the engineering profession, was considered not beneficial by more than half of the frenges, who are all required to take this one credit-hour per

semester class. According to the manual, this course teaches "the role of engineering in a technological society," among other intangibles. Unfortunately for the instructor of this class, such common-knowledge intangibles do not exactly kindle the flame of a large number of freshmen bored by the details of one of the lecturer's pet problems in controlling the pollution of our environment. Moreover, more than half of those polled also felt that the course is cheduled at an inconvenient time – Tuesday, late afternoon. This time was chosen, it is assumed, so as not to interfere with other courses the frenge must take, and as a result it interferes with his non-academic plans. I personally would regret the waste of time for all concerned if next year's freshmen are required to take an identical course, and if he is required to take a similar semester of Applied Science 2. Many hoped the course could be expanded and broadened to include practical information about the engineering courses they will be going through in the future, and about what to do with a B.S. in Engineering from G.W.U. when they get it. More suggested simply abolishing it.

Me · Kél · I · Sív

When questioned about *Mecheleciv,* 32% of the frenges were satisfied, 18% wanted more informative articles, 30% wished for a bit more humor to brighten their dreary days, 20% hoped the magazine could become more relevant to G.W., a few didn't know what a mecheleciv was, and one said she wasn't taking the course. The most oft-asked query was "Exactly what does 'Mecheleciv' mean, or where did it come from?" The quick-witted response from the Editor assured me that the title merely represents facets of MECHanical, ELEctrical, and CIVil engineering, and nothing more. According to the poll, Mech Miss is the one feature the frenges look forward to the most. Now you know where the frenge mind is.

Shine On Brightly

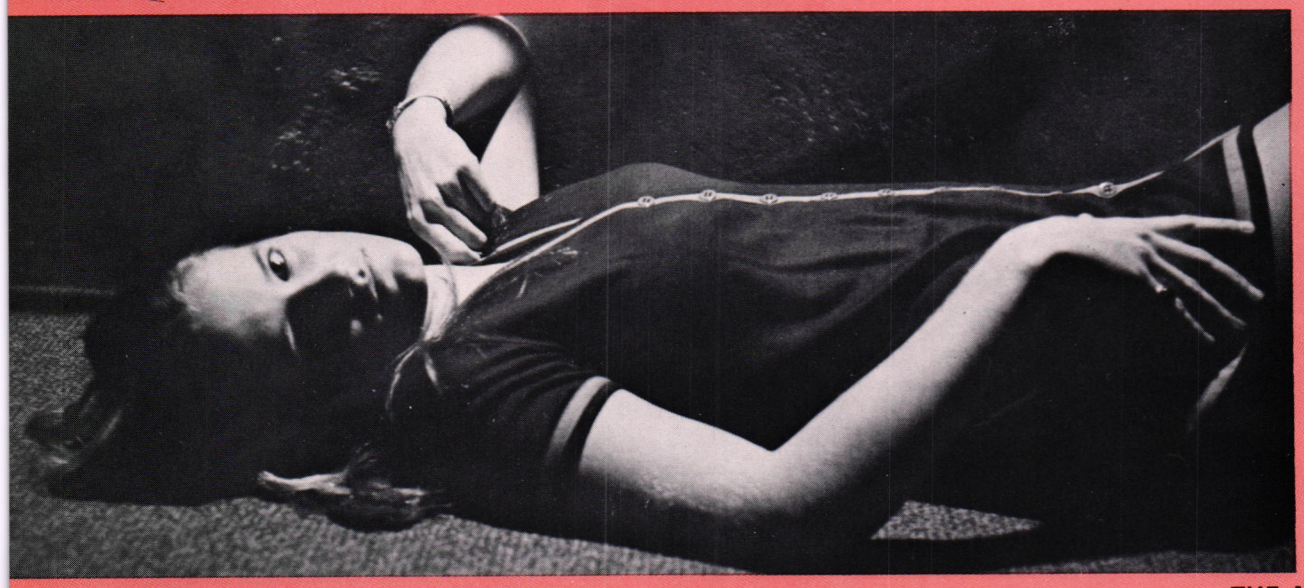
This frenge was impressed by the amount of interest in and concern about G.W.U. revealed by other engineering freshmen. Complaints about building priorities (a new Medical Building instead of something to relieve the parking situation?), the library and physical education facilities, student center hours, and the scarcity of available key-punch machines were brought out.

Dean Liebowitz has perhaps not considered one source to help in his goal of G.W. becoming a "Cal Tech East" – interested frenges, who are aware that they are the ones who will benefit more than other students from any improvements in the G.W.U. educational process. To the belief that the ball can be kept rolling with the support of the Class of '74 engineers – Skoal!

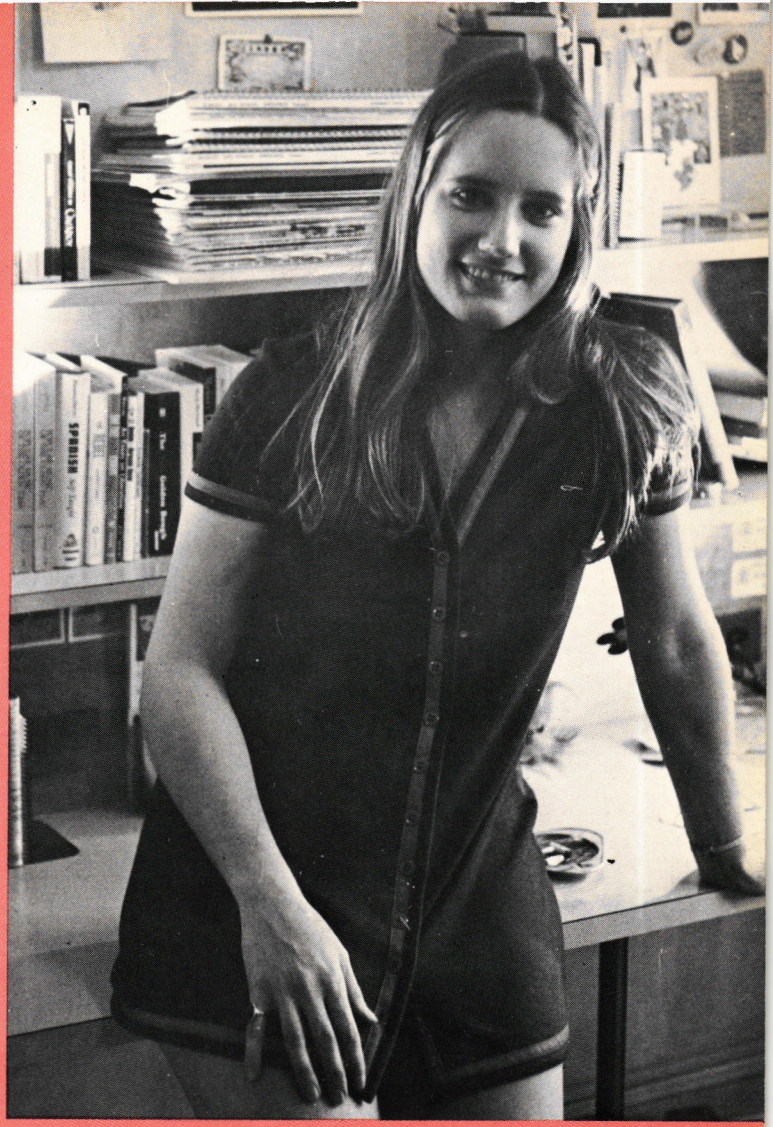
MECH

Francesca Shager

Photographed By:
Dick Tabor &
Dan Holtsclaw



MISS



We are pleased to introduce Francesca Schager as our Mech Miss for this issue. "Fran" (36-26-36) is a junior transfer from Pine Manor Junior College. The interests of G.W.'s attractive 22 year old Art History major include: sailing, tennis, tree climbing, and the obvious – horseback riding. A native of Oyster Bay, L.I., she plans an apprenticeship in art restoration upon graduation.

TECH NEWS

EXIT AREAS ON FREEWAYS TO BE EXAMINED

The most dangerous area in the modern freeway system is the exit location, where more accidents occur than on the entrance areas and the main travel lanes. In particular, accident rates are highest on the exit gore – the tapered "no man's land" that separates the main travel lane from the exit ramp. Not only is the incidence of accidents high, but the severity of the average accident is also high because of the presence of signs, abutments, and other fixed objects that are usually to be found in these areas.

Why should the exit gore be a high-hazard location? Too often the accident is caused by erratic driving behavior that may be due to deficiencies in the driver's ability to make quick decisions. Other factors that are often linked up with this are a lack of adequate signing or faulty geometric design and traffic control devices.

In an effort to improve traffic operations and safety at exit areas, the NCHRP has entered into a contract with the Pennsylvania State University, whose Transportation and Traffic Safety Center will conduct the necessary research.

Specifically, the research contract will cover the relation of erratic vehicular movements to drive indecision, lack of adequate information, and misleading or inadequate geometric design and traffic control devices, and is expected to result in recommendations leading to early improvements in operations and safety at exit gore areas.

Over a 15-month period beginning January 1, 1971, the researchers will review past and current research pertaining to the problem of traffic operations and safety at exit gore areas; prepare a "state-of-the-art" summary of the review; determine the causes of erratic driver behavior in the vicinity of exit gore areas; recommend remedial measures to improve traffic operations and safety in these areas; evaluate existing design and traffic control criteria and recommend necessary changes.

RESEARCHERS TO PROBE USE OF MEMBRANES FOR WATERPROOFING CONCRETE BRIDGE DECKS

There are approximately 200,000 bridges in the country's state highway system. Any problem which arises in their maintenance obviously becomes a major financial and logistical item. A continuing headache to maintenance personnel has been the deterioration of concrete bridge decks due to penetration of water and deicing chemicals through the deck surface.

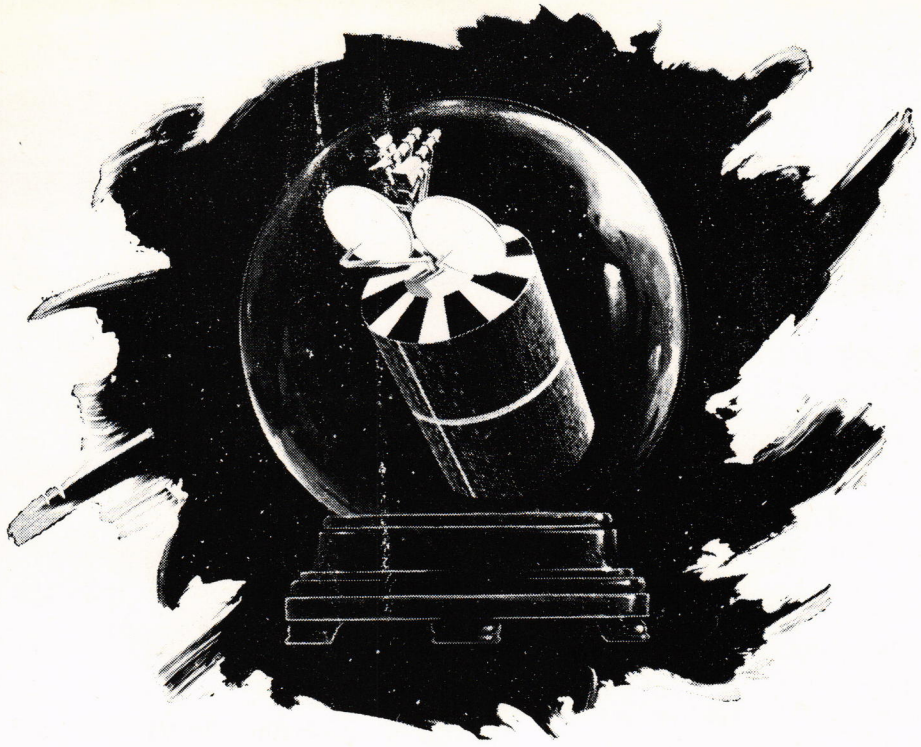
In an effort to alleviate the problem, the National Cooperative Highway Research Program (NCHRP), has entered into a contract with Materials Research Development, Inc., of Oakland, California.

The Research firm will attempt to develop an effective waterproofing membrane system that can be placed over the entire deck surface. To be effective, such a membrane must maintain bond with the deck surface and must have sufficient elasticity to bridge active cracks without rupture over the bridge's normal range of temperatures and loading.

It is anticipated that, in order to realize an acceptable degree of permanence, the membrane will either be protected by a wearing surface, such as asphaltic concrete, or will provide adequate wearing qualities within itself.

The contract calls for the research agency to conduct a detailed literature search; to define the service requirements for effective membrane systems; to conduct sufficient field inspections to evaluate selected systems, including application techniques; and to conduct controlled laboratory studies to identify and define those properties that affect performance of membrane systems, and devise qualifying tests relative to field performance.

In addition, they will develop a procedure for determining cost benefit ratios associated with the use of membrane systems, and demonstrating the procedure by example cases. Finally, they will devise an experimental program for



There may be a satellite in your future....

Your degree in electronics, astronautics or physics; in business, personnel or marketing; or in international affairs may have prepared you for an interesting and challenging future in the exciting new world of commercial satellite communications.

A global system of communications satellites over the Atlantic, Pacific and Indian oceans already links a growing number of earth stations in different countries . . . from 30 different countries early in 1970 to at least 55 different countries by 1972.

Live television across the oceans via satellite has added a new dimension to international understanding. People now have front row seats to history as it is being made, and they can also communicate directly with each other via telephone, telegraph, data and facsimile. This can help close the gap of misunderstanding between nations and people, and opens up new opportunities for college graduates with degrees in many different fields.

Now, COMSAT is planning to apply for communications within the United States, and also to improve communications between transocean airlines and ground control centers.

Communications Satellite Corporation may have a place for you. Satellite systems of the future are being created now by COMSAT scientists and engineers. For this purpose, they have a $12 million facility—the COMSAT Laboratories. Other technical people operate satellites and earth stations. They, in turn, are backed by business and administrative people challenged by new ways of doing business.

COMSAT is a young, privately-owned corporation with a big job ahead. Your future could be tied to ours by a new technology with unlimited horizons.

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Mr. Paul G. Gaffney
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evaluating the performance in the field of selected membrane systems under service conditions.

The NCHRP was created in June 1962 as a means to accelerate research into particularly acute problems affecting highway transportation on a nationwide scale. It is sponsored by the American Association of State Highway Officials in cooperation with the U.S. Department of Transportation's Federal Highway Administration.

WESTINGHOUSE INTRODUCES ITS FIRST ALL-WEATHER ELECTRIC PICKUP

A reinforced fiber glass cab and safety-glass windshield with wiper give an all-weather capability to the new Model 135 Pickup, latest addition to the Westinghouse line of electric-battery-powered vehicles and its first all-weather pickup truck.

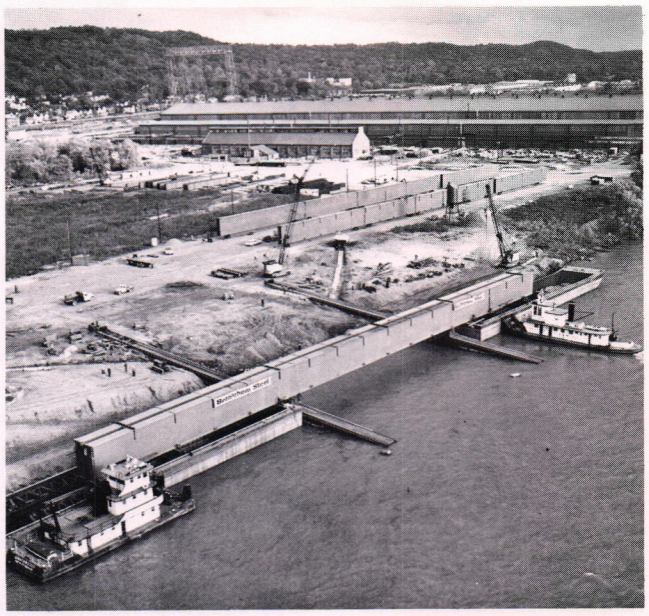
Industrial plant complexes, warehousing facilities, mobile home parks, outdoor sports facilities, universities, schools, and other institutions will find the vehicle a silent, fume-free and low-cost means of moving men and materials through their areas.

Mail, maintenance and security patrols are typical applications. The truck carries two passengers plus up to 500 pounds of cargo on its 42-by-33-inch deck. A dependable four-solenoid resistor-type control gives smooth speed changes up to top speed of 12 miles per hour, while the vehicle's three-wheeled design gives easy maneuverability.

Six six-volt lead-acid batteries power a 4-½-horsepower traction-rated d-c motor through an enclosed automotive-type drive. After about 30 miles, the heavy-duty 170-ampere-hour batteries will need a recharge. A built-in automatic battery charger plugs into any 110-volt outlet.

Frame, deck, and doors are steel. The doors have snap-on vinyl plastic windows. Rear tires are 5:00 x 5:70 x 8 and the front tire is 8:50 x 8.

The vehicle is 102 inches long, 45 inches wide, and 66 inches high and weighs 1125 pounds with batteries.



NEW GIRDER LAUNCHING SYSTEM

New girder-launching system at Bethlehem Steel Corporation's Leetsdale, Pa., fabricating works is put to the test for the first time as two 400-foot-long, 16-foot-high bridge girders are loaded onto waiting barges. Tie-down operations will follow, including insertion of a third barge between the initial two at launch ramps. The 5-1/2-foot-wide girders each weigh about a ton a foot. They, and others like them, will be towed to a major bridge construction project at Memphis, Tenn. Availability of the system opens new design opportunities for engineers and contractors working on projects anywhere along the vast Mississippi River waterway. Conceivably, entire bridges or even massive lock and dam gates – completely prefabricated in the shop and ready for field erection as a single unit – could be shipped with the new system, for example. In effect, the new facility permits some of the economies of shop fabrication to be transported to the field on a large scale.

ECONOMIC EFFECTS OF CHANGES IN LEGAL VEHICLE WEIGHTS AND DIMENSIONS TO BE STUDIED

When Congress or the various State Legislatures change the regulations governing maximum limits of motor vehicle weights or dimensions using the highways, the effects are far-reaching. Not only do the changes affect the load-bearing characteristics of the highway, but geometric design, bridge dimensions, and even financing and budgeting have been taken into consideration. There is currently no clear definition of such things as the interrelationship

between changes in the law and resulting changes in axle weights on the highway, and this lack of information makes legislation and management decisions difficult.

A step in the right direction was taken recently with the signing of a research contract between the National Cooperative Highway Research Program (NCHRP), which is administered by the Highway Research Board, and Wilbur Smith and Associates, Washington, D.C. The contract is expected to take 18 months to complete.

The research company is charged with the task of critically reviewing past and current research relating to consequences of possible changes in legal vehicular weight and dimension limits. They will then prepare a document for use by highway departments and others in estimating the effects of such changes.

The synthesis of knowledge and guidelines developed from this project should be of great assistance in making management decisions relative to design of pavements, bridges, highway geometrics, overall highway maintenance policies and procedures, improvements and maintenance. The results should also be of value to legislators interested in a better understanding of the cause and effect relationship between changes in law and everyday practices.

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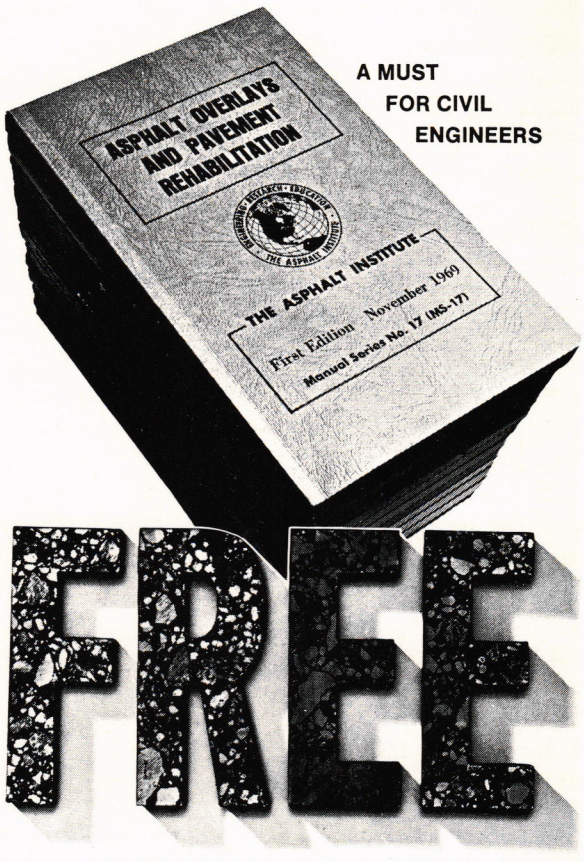

authoritative new manual covers methods for pavement rehabilitation

ASPHALT OVERLAYS and PAVEMENT REHABILITATION, First Edition (Manual Series No. 17) contains 134 fact-packed pages, all about Asphalt overlays and pavement rehabilitation. Complete with drawings, charts and photographs, it simplifies the subject for the engineer responsible for road and street rehabilitation and maintenance. Contents include latest information about such matters as:

- Pavement condition survey methods
- Preparing pavements for overlays
- Design and construction of Asphalt overlays, shoulders, pavement widening, and appurtenances
- Testing procedures and guide specifications.

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THE WATCHER

AN APPEAL FOR JUSTICE

Not long ago, the Watcher had the opportunity to attend an Appeal Session of the Court of Claims in Washington, D.C. The cases being appealed pertained to violations of the patent rights of private citizens or public corporations by the United States Government.

The two cases observed by this writer were highly technical in nature. One case concerned a production technique for printed circuit boards; the other case dealt with a dispute over a certain computer memory system (disk), and accompanying computer processing unit (CPU).

Present on the bench at the Appeal Session were six judges. To this author, they appeared to resemble the French Revolutionary Tribunals during the "Reign of Terror" in France.

As you may remember from your high school European History classes, the French Revolutionary Tribunals were made up of men of "firm" ideological beliefs – I use the word, "firm", with some reservations. Those eighteenth century judges who sat on the court bench were not men versed in the laws of civilization. Rather, they were men politically appointed to carry out a venomous genocide.

Today, at the Court of Claims and Customs Appeal, the judges are also politically appointed. These judges must be able to render justice in areas that would require them to have a reasonable knowledge of the physical sciences and engineering – but they are not appointed because of their technical education or background.

Although the judges of the Court of Claims are not of the vindictive purpose that the French Tribunal judges were, their capabilities to render a just decision in cases of this nature are in question.

It is a very disheartening display of democracy when, at times, a verdict can be reached in this court based upon the showmanship of the attorneys involved. This distressing display is due to the need for the lawyers to educate the judges in the basic technical subject matter of these cases, thus leaving the decision of the court hinged upon the teaching abilities of the lawyers along with their legalistic adequacies.

It has been said by many that our society is advancing too rapidly, in technological areas, for mankind to adjust properly to the changes. But to retard the progress of our technology is rather counter-productive to the meaning of civilization.

The word civilization is defined as the advancement in social culture, or more precisely, a state of social culture characterized by relative progress in the arts, science, and statecraft. It seems from the above definition – which is directly from Webster's Dictionary – that statecraft is the villian of the philosophical rambling.

For the appointments to the Court of Claims and the French Revolutionary Tribunal to be based upon a similar criterion would seem quite non-progressive under the definition of civilization. To hold back technological progress on account of an antiquated court appointment system is just plain savage. The judges at the Court of Claims should be required by law to hold degrees directly related to the technical areas in which they must render a decision. Only in this way can legal justice begin to be assured and progress be continued.

Campus News

HELP!

Engineer's Week Preparations are rapidly approaching its final stages. We have acquired interesting and stimulating exhibits in many of the areas of concern today. In environmental protection, sound and water pollution are two of the areas of major interest in the exhibition. In consumer protection, we have acquired a laser-hologram identification system for credit cards which can be tied into computers for mutual use in many cities. This is a unique system in which positive and immediate identification of the buyer is on the hologram in the form of a picture and/or other information which can be flashed on a screen. At the same time the credit card number can be checked with a central computer to make sure it is a valid number. This all can take place in a matter of a few seconds.

Space research has had a tremendous impact on the research and development in the application of computer science to medicine. The simultaneous development of electrodes and computers in the checking of the astronaut's health in space are now being used in hospitals as watchdogs for changes in patients' health. This new use of computers in hospitals is a direct result of the space program. During Engineer's Week, we will display such a working unit from the Intensive Care Unit at the George Washington University Hospital. This set up uses a computer and electrodes to analyze patient data and give a signal to a nurse on duty if this data is off by a given amount.

The space program has also resulted in obtaining physical data from space which will be used in research in trying to understand the evolution of the planets and the universe. The Moon Rocks have resulted in new research. This research will be shown in an exhibit that has just recently returned from the Soviet Union.

However, Engineer's Week can not be a success without participation. We need help in writing articles for a special issue of *Mechelecív,* in setting up and planning certain displays, and of course, as tour guides. HELP is NEEDED to make this year's Engineer's Week a success. CONTACT: Dick Tabor (223-0985) or Mike Seijo (587-3933) or leave a note in the Engineer's Council mailbox, Room 100, Tompkins.

TENTATIVE SCHEDULE FOR SEAS ACTIVITIES

Engineer's Week	Feb. 22-27	
Engineer's Ball	Feb. 27	7:00pm
Elections for council positions	First week of March	
Council Meeting	March 18	9:00pm
Awards Night	April 30	4:00pm

Anyone arranging for a meeting or other activity is requested to contact Jerry Bonn at 466-2978, so that the event may be included in the councils calendar and possible scheduling conflicts may be avoided.

ACADEMIC COMMITTEE

The academic committee of the SEAS student council was established to provide students of SEAS with a proper channel of communication of academic matters with the Faculty and Administration of the school.

Problems of an academic nature should be brought to the attention of the Chairman of the Committee or any of its members. The Committee members shall then meet to discuss the problem. After all pertinent facts have been compiled, a statement of fact signed by the Committee will be brought up to the full Council at the next regular session. If the situation warrants it a meeting with the Council's Executive Officers will be requested and the matter brought to their attention.

Cross to locate the children and plan the activities. Lunch was served when the children arrived shortly after twelve o'clock. The kids out ate the brothers two sandwiches to one, but not one of them was sick. At one o'clock, a puppet show was performed by the Marrionettes, which was really enjoyed by everybody. Santa arrived afterwards, as plump and jolly as could be. With presents for all and a belly full of ho ho's, he spread a joy and laughter that still echoes in the hollows of the D-H House.

THETA TAU FRATERNITY

Dean Harold Liebowitz has been chosen by the brothers of Theta Tau to become an Honorary Member of their Fraternity. In the few years he has been with S.E.A.S., the Dean has won the friendship and respect of many. Because of Theta Tau's widespread involvement in the School's organizations and activities, many of the members have come to know the Dean quite well. He has taken an active interest in the students and has expressed his desire for greater communication between the students and the administration. Dean Liebowitz will be initiated on February 6.

On December 12, Theta Tau held a Christmas Party for children from Meriwether Orphanage. It was the Fraternity's first attempt at such a community service, but everything went surprisingly well. Much of the organization was handled by Howie Kellman, who worked with the Red

TAU BETA PI

The George Washington University chapter of Tau Beta Pi, the national engineering honor society, initiated five new members on Dec. 12. They are:

Sidney J. Harmon II

Michael R. Rymond Jr.

Allan C. Waldron

Nicholas E. Worth

Congratulations to these men on their membership into Tau Beta Pi whose purpose is "to offer appropriate recognition for superior scholarship and exemplary chapter to technical students and professional persons."

CONTINUING ENGINEERING EDUCATION

One of the most commendable and promising enterprises recently undertaken by the School of Engineering and Applied Science at The George Washington University is the Continuing Engineering Education Program. The program is designed to provide engineers with the latest information in areas that apply to their particular field, and to broaden and diversify their knowledge. As evidenced by present trends, engineers must be more flexible and more current; so it becomes necessary that they continually develop and maintain a high level of competence through a continuous education. No institution is more capable or better equipped than a university to provide this education.

The Engineering School began its CCE Program in July, 1968. The Program Director, Mr. J.E. Mansfield, and his assistant Mr. C.D. Brown command the program from their offices at 2424 Pennsylvania Avenue. Two rooms there are also used for classrooms and several others are utilized for processing the outgoing mail. Brochures on the courses being offered are mailed to people throughout the United States, Canada and Mexico.

Planning for a course must begin months before it is presented. Frequently, members of our faculty are asked to coordinate and outline a course. The courses usually last for a few days and are taught by several instructors including both practicing engineers and those in the field of education. Although there has been some interest expressed in offering courses on a credit basis perhaps leading to degrees other than those now offered, this is not the case at present. Courses are offered on a non-credit basis with the specific objective of enhancing the competence of the individual as a practicing engineer.

Systems Analysis, Operations Research, and Advanced Engineering Mathematics are a few of the courses designed specifically to acquaint the practicing engineer with engineering tools that have been developed since they received their degrees. Courses aimed at broadening and diversifying engineers' knowledge include Management Information Systems, Water Quality Control, and Ocean Engineering-Instrumentation, etc. The students participating in these courses at George Washington are usually operating engineers or middle managers. They may be young or in their late fifties and have bachelor's to doctor's degrees. With only a few exceptions, students attending the courses are financed by their employers.

It is becoming more and more apparent that the basic engineering education is not sufficient. The ever increasing rate of technological change places the responsibility on universities to recognize the need for a continuing studies program. Fortunately, SEAS has recognized this need and is doing something about it.

JOB INTERVIEW SCHEDULE

The following companies are presently scheduled to interview on campus. For more detailed information, check with the placement office in Woodhull House.

March

2nd: Potomac Electric Power Company
Bell Systems

4th: Office of Education, HEW
Board of Education of Frederick Schools, Md.

5th: RCA
Office of Education, HEW

8th: Department of Highways, West Virginia

9th: COPSOM, Department of Navy
City School District of New York

10th: Federal Communications Commission

11th: Metropolitan Sanitary District of Greater Chicago

12th: Virginia Department of Highways
Department of Public Works

17th: Montgomery County Public Schools

18th: Public Schools of D.C.
Naval Ship R-D Lab

19th: Greenwich Schools
County School Board of Loudoun County

22nd: Montclair Public Schools

24th: Army Corps of Engineers–Baltimore, Md.
Wyoming Highway Department

31st: The Public School of Worcester

"KEEP SMILIN', I'VE GOT A GUN IN YOUR BACK"

"SECRETARY OF THE MONTH"

"GET OFF MY BACK"

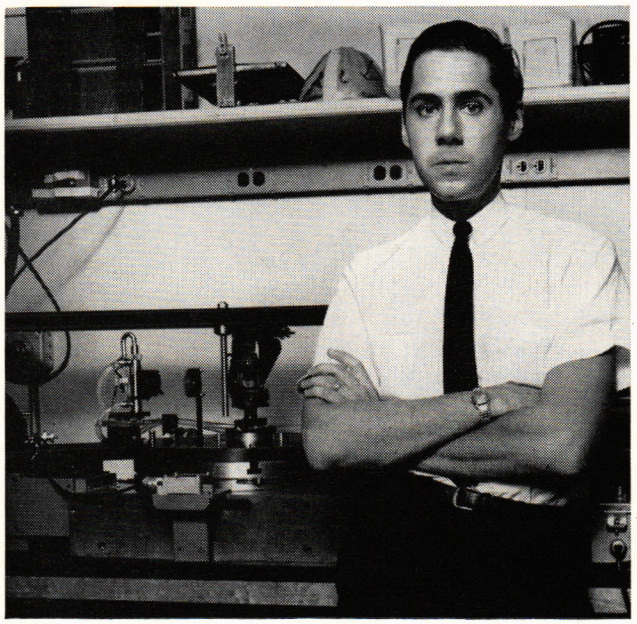
"There's a little more freedom here to direct my own research than at most company labs."

Bob Pfahl, Western Electric

Thermal energy is his field. And since 1968, Bob Pfahl has been doing research and development in radiant heat transfer on the staff of Western Electric's Engineering Research Center.

Well-backgrounded, Bob holds three degrees from Cornell University—a bachelor's in mechanical engineering, and a master's and doctorate (received in 1965) in heat transfer.

"My job is self-motivating," said Bob. "I have to look ahead to see where I think research should be done."



And one such area was the design of heating equipment. Western Electric uses radiant heating in a variety of manufacturing processes because it's quick and inexpensive, and because it can be applied at a distance.

However, because of the limitations of existing reflectors, radiant heating has been limited to small areas. Bob has developed a reflector shape which uniformly distributes energy from a compact mercury arc lamp over larger circular areas.

"Many projects grow out of previous or existing work," Bob said. He explained that in order to calculate the reflector shape, he had to first design an instrument to measure reflectance of the reflector material.

"But we're well supported here at Western Electric," said Bob. "We have very fine lab equipment—and can obtain the equipment we need."

So Bob designed and built his "spectral bi-directional reflectometer." It provides data for a computer program he created that calculates reflector shape by numerically integrating a set of differential equations.

Bob is currently working on the development of an even newer type reflector which will distribute energy from line type filament lamps over a large rectangular area. An array of these reflectors will allow the uniform heating of almost any size workpiece.

"We're free to look around for our own projects," said Bob. "I like that—that's why I'm here."

Western Electric

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On your way up in engineering, please take the world with you.

The best engineers are far from happy with the world the way it is.

The way it is, kids choke on polluted air. Streets are jammed by cars with no place to go. Lakes and rivers are a common dumping ground for debris of all kinds.

But that's not the way it has to be.

Air pollution can be controlled. Better transportation systems can be devised. There can be an almost unlimited supply of clean water.

The key is technology. Technology and the engineers who can make it work.

Engineers at General Electric are already working on these problems. And on other problems that need to be solved. Disease. Hunger in the world. Crime in the streets.

General Electric engineers don't look for overnight solutions. Because there aren't any. But with their training and with their imagination, they're making steady progress.

Maybe you'd like to help. Are you the kind of engineer who can grow in his job to make major contributions? The kind of engineer who can look beyond his immediate horizons? Who can look at what's wrong with the world and see ways to correct it?

If you are, General Electric needs you.
The world needs you.

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